

Neutrino particle astrophysics: status and outlook

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The discovery of astrophysical neutrinos at high energy by IceCube raises a host of questions: What are the sources? Is there a Galactic as well as an extragalactic component? How does the astrophysical spectrum continue to lower energy where the dominant signal is from atmospheric neutrinos? Is there a measureable flux of cosmogenic neutrinos at higher energy? What is the connection to cosmic rays? At what level and in what energy region should we expect to see evidence of the π^0 decay photons that must accompany the neutrinos at production? Such questions are stimulating much theoretical activity and many multi-wavelength follow-up observations as well as driving plans for new detectors. My goal in this presentation will be to connect the neutrino data and their possible interpretations to ongoing multi-messenger observations and to the design of future detectors.

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